

City of Elk River (PWS 2180013)
SOURCE WATER ASSESSMENT FINAL REPORT

March 8, 2005



State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of this designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for City of Elk River (PWS #2180013)*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from system construction scores and potential contaminant/land use scores. Therefore, a low rating in one category coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different intakes can be subject to various contamination settings, separate scores are given for each type of contaminant.

The City of Elk River drinking water system consists of two ground water wells and has recently added a surface water intake to their drinking water distribution system. This report focuses on presenting a source water protection area for the surface water intake. For information on the source water assessment of the two ground water wells, refer to *City of Elk River Source Water Assessment* (DEQ, 2002). The surface water intake is located on the upper end of Elk Creek Reservoir. The pump station is on Elk Creek, in the marshy area created by the transitioning of the creek into the reservoir. The pump station obtains water that is collected in a 1000 foot long infiltration gallery along Elk Creek. The water is pumped from the stream up to a filtration system where it is treated before entering the distribution system. Because of the presence of UST (underground storage tanks) sites, LUST (leaking underground storage tanks) sites and a CERCLA (Comprehensive Environmental Response Compensation and Liability Act) site in the delineated watershed boundary and the vulnerability of surface water intakes in general, the City of Elk River's drinking water system is considered to be a high risk for contamination.

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS), the State Drinking Water Information System (SDWIS), and the City of Elk River records. The IOC sodium was detected in a routine sample collected from the intake in September 2004 at a very low concentration (5mg/l). Currently there is not a maximum contaminant level established for Sodium by the Environmental Protection Agency (EPA). All other constituents sampled for were below detectable limits if present at all.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well or surface intake sites should be located in an area with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Elk River system, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Any spills from any future potential contaminant sources should be carefully monitored, as should any future development in the delineated areas. Since most of the designated protection areas are outside the direct jurisdiction of the City of Elk River, collaboration and partnerships with state and local agencies and industry groups should be established and are critical to success of source water protection.

Due to the time involved with the movement of source water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting or not-regulatory in nature (i.e. good housekeeping, public education, and specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE CITY OF ELK RIVER, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included (Figure 2, Table 1). The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. SWAs for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. As a result, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Elk River has a population of approximately 150 people and is located in the northwest corner of Clearwater County, Idaho. This recreational based community is located approximately 50 miles east of Moscow, Idaho along State Highway 8 at an elevation of approximately 3000 feet above mean sea level. The City of Elk River drinking water system consists of two ground water wells and has recently added a surface water intake to their drinking water distribution system. This report focuses on presenting a source water protection area for the surface water intake.

The most significant potential water problem for the City of Elk River is the presence of UST, LUST, and a CERCLA sites in the area. For example, a local tavern was known to have a LUST but has recently been cleaned up.

Defining the Zones of Contribution--Delineation

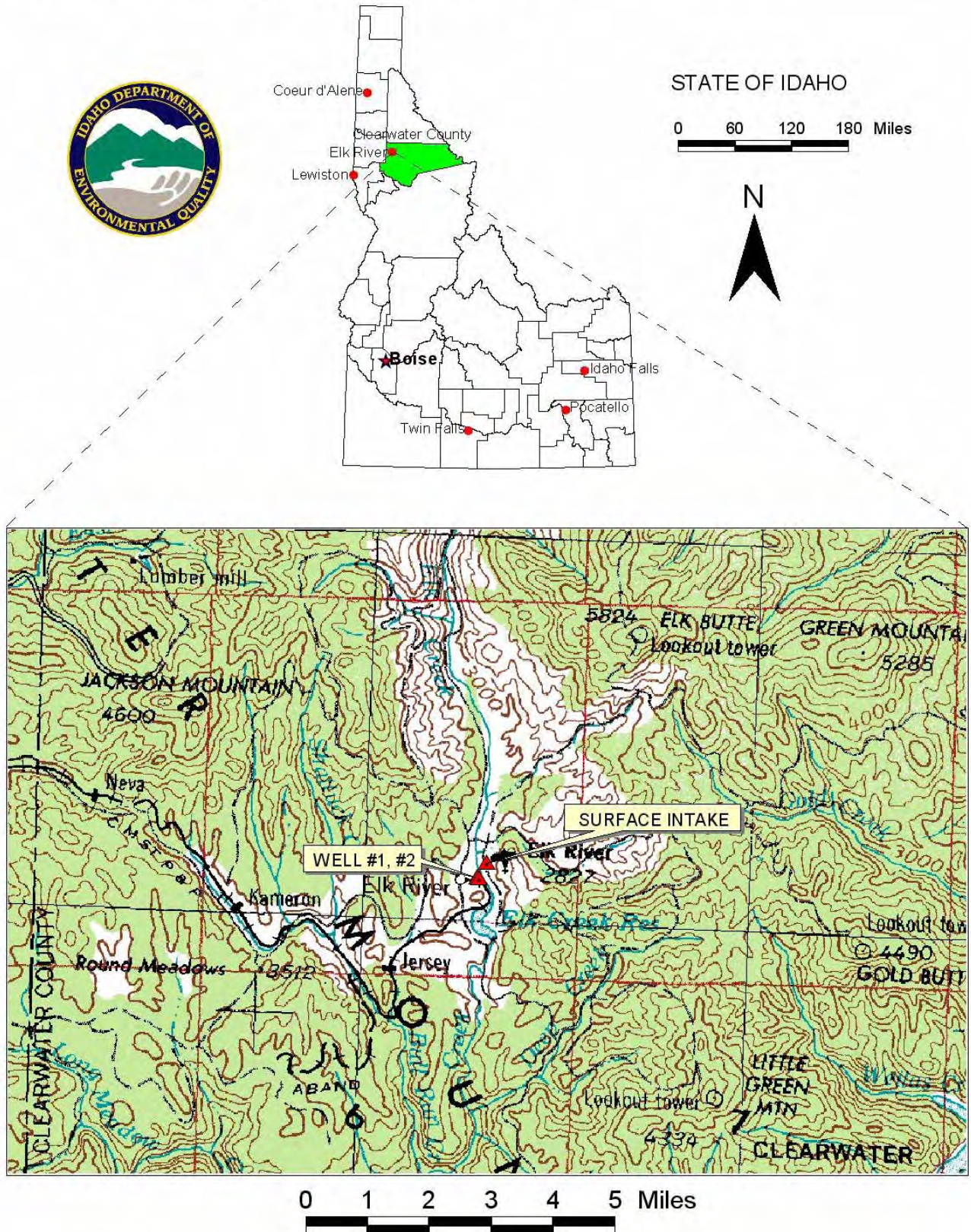
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution. To protect surface water systems from such potential contaminant pathways, the EPA required that the entire drainage basin be delineated upstream from the intake to the hydrologic boundary of the drainage basin (U.S. EPA, 1997). This process included mapping the boundaries of the watershed draining into Elk Creek Reservoir upstream of the intake. In addition to the watershed boundaries, the area encompassing the town of Elk River, which did not lie within the watershed boundary, was also included. This area has the potential for contaminants to migrate to the intake via subsurface flow and contaminate the water supply, so this small portion of the delineated area was included for a conservative measure.

Hydrologic Setting

The surface hydrology of the area includes Elk Creek, the primary tributary to Elk Creek Reservoir. The Elk Creek watershed drains approximately 23 square miles of forested land into Elk Creek Reservoir, which is located a few hundred feet to the southeast of the town. Water flowing in Elk Creek is temporarily contained in the Elk Creek Reservoir before it passes through the dam and continues to flow into Dworshak Reservoir. The upper end of Elk Creek is the location for the new surface water intake associated with this report.

The pumping station for this surface water source is located a few hundred feet to the northeast of the town of Elk River, at the upper end of Elk Creek Reservoir. The location of the pump station is on Elk Creek, in the marshy area created by the transitioning of the creek into the reservoir. The pump station obtains water that is collected in a 1,000 foot long infiltration gallery along Elk Creek. The water is pumped from the stream up to a filtration system where it is treated before entering the distribution system.

FIGURE 1 Site Vicinity Map of City of Elk River



Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the City of Elk River consists of sewage disposal ponds, horse pasture, and State Highway 8. To the west of the city is predominantly urban land uses, while east and south of the city is mostly undeveloped

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the business, facility, or property. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply intake.

Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted during October 2003. The inventory involved identifying and documenting potential contaminant sources within the City of Elk River Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ (Figures 2, and Table 1). An enhanced contaminant inventory was conducted in January 2005 in which the system operator was allowed to review the potential contaminant inventory conducted by DEQ. No additional potential contaminant sources were identified by the system operator.

The delineated source water area encompasses the entire watershed draining into Elk Creek Reservoir upstream of the intake. Within the delineated source water area, potential contaminant sources include 4 underground storage tanks (USTs), along with one leaking underground storage tank (LUST) that has recently been cleaned up. A national pollutant discharge elimination system (NPDES) and a comprehensive environmental response compensation and liability act (CERCLA) site are also present in the delineation area. Additionally the delineation area includes State Highway 8, sewage disposal ponds and an old mine site. In the unlikely event of a spill, all types of contaminants could be added to the aquifer. Table 1 lists the potential contaminants of concern and informational source.

Table 1. City of Elk River, Potential Contaminant/Land Use Inventory

SITE #	Source Description	TOT Zone¹ (years)	Source of Information	Potential Contaminants³
1	LUST -	3 YR	Database Search	VOC, SOC
2 - 6	UST	3 YR	Database Search	VOC, SOC
7	NPDES Site	3 YR	Database Search	
8	CERCLA Site	3 YR	Database Search	
9	Mine Site	3 YR	Database Search	IOC
	State Highway 8	3 YR	GIS Map	IOC, VOC, SOC, Microbes
	Sewage disposal ponds	3 YR	GIS Map	IOC

¹TOT = time of travel (in years) for a potential contaminant to reach the wellhead

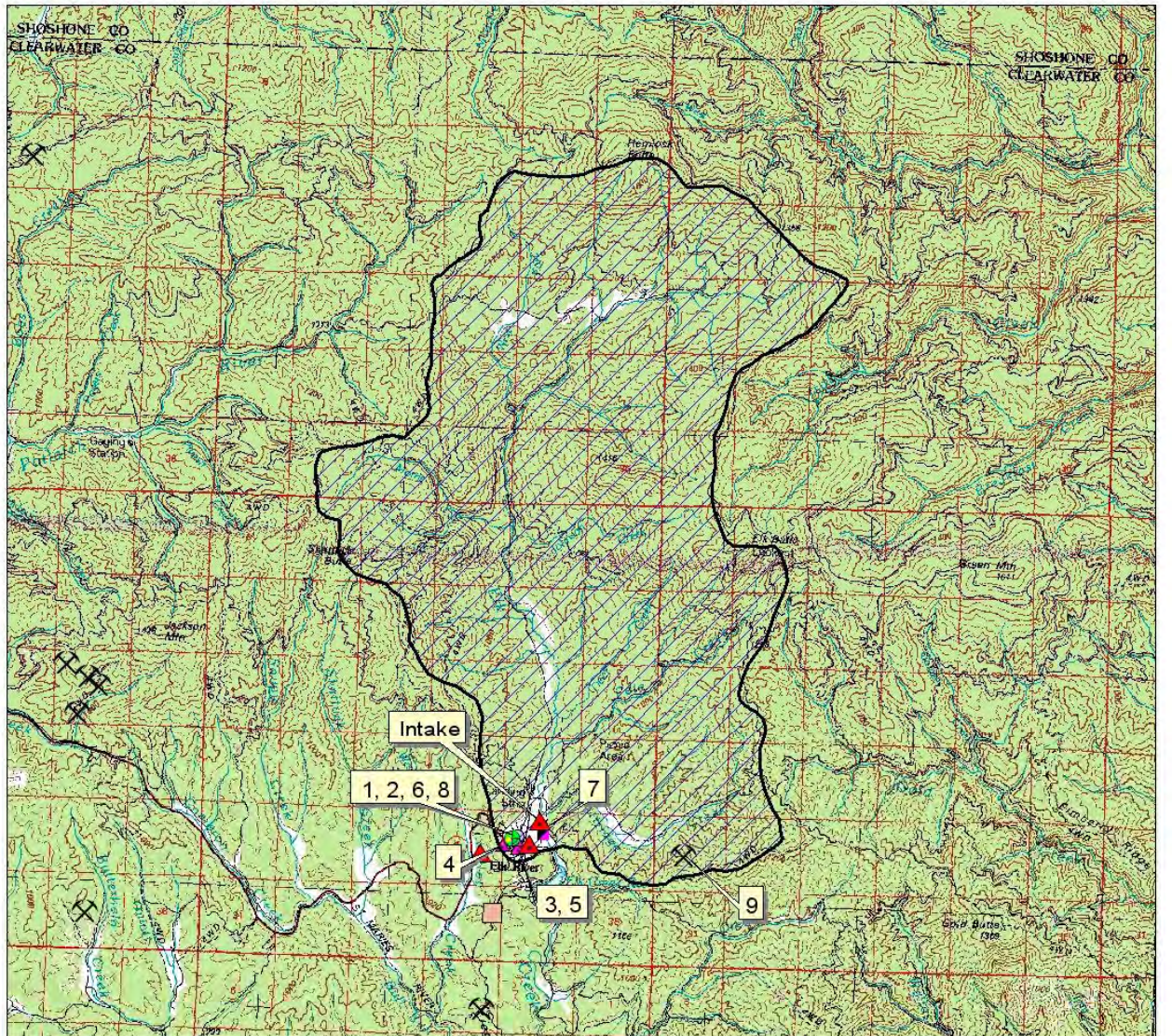
²IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

³UST = underground storage tank, LUST = leaking underground storage tank

⁴NPDES = national pollutant discharge elimination system

⁵CERCLA = comprehensive environmental response compensation and liability act

Figure 2. City of Elk River Delineation Map and Potential Contaminant Source Locations



0 1 2 3 4 5 Miles



PWS# 2180013
Surface Water Intake

Section 3. Susceptibility Analyses

The susceptibility of the source at the intake was ranked as a high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity, construction of the intake, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheet for the system. The following summaries describe the rationale for the susceptibility ranking.

Intake Construction

The construction of the City of Elk River public water system intake directly affects the ability of the intake to protect the source from contaminants. The intake is relatively new, therefore the construction of the intake has been properly completed. However directly upstream of the intake, a section of the stream exists which is open to the environment and therefore potentially at risk for contamination. The intake system construction scored moderate risk but was elevated to a high risk due to the open stream section above the intake, which leaves the system vulnerable to any contaminants that may be introduced to the Elk River (Table 2).

Potential Contaminant Source and Land Use

The City of Elk River received land use scores as follows: low land use for IOCs (i.e. nitrates, arsenic), VOCs (i.e. petroleum products, chlorinated solvents, SOC (i.e. pesticides), and microbial contaminants (i.e. bacteria). The lack of significant agricultural land within the area contributed to these scores. There have been no past MCL exceedences of IOC, SOC, VOC, Total coliform bacteria, fecal coliform bacteria, or *E. coli* bacteria in the water tests. Therefore, historically the system scores low in susceptibility for the historic contaminant inventory portion. However several other potential contaminant sources exist in the area which creates a high risk for contamination to the system (Table 1).

Table 2. Summary of City of Elk River Susceptibility Evaluation

	Susceptibility Scores ¹								
	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
	IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Intake	L	L	L	L	M (H*)	L (H*)	L (H*)	L (H*)	L (H*)

¹H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

H* = Source automatically scored as high due to presence of a potential contaminant source in the delineated area.

Susceptibility Summary

The intake rated low for the inorganic chemical class, VOCs, SOCs, and microbials. However the presence of the UST, LUST and CERCLA site along with the vulnerability of the surface water intake automatically give this system a high risk rating for contamination. Additionally the presence of State Highway 8 and the sewage disposal ponds in the area magnify the potential for contamination to the system.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Elk River, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. The City of Elk River should also be diligent about local businesses that are regulated by the various environmental regulations (RCRA, CERCLA, SARA) or those with potential inorganic contaminants. Most of the designated areas are outside the direct jurisdiction of the City of Elk River. Partnerships with state and local agencies and industry groups should be established and are critical to success of drinking water protection.

Due to the time involved with the movement of source water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Lewiston Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Lewiston Regional DEQ Office (208) 799-4370

State DEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (harperm@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

EPA (U.S. Environmental Protection Agency), 1997, State Methods for Delineating Source Water Protection Areas for Surface Water Supplied Sources of Drinking Water, EPA 816-R-97-008, 40p.

Department of Environmental Quality (DEQ), 2002. City of Elk River (PWS 2180013) Source Water Assessment Final Report.

Attachment A

City of Elk River
Susceptibility Analysis
Worksheets

The final scores for the City of Elk River susceptibility analysis were determined from the addition of the Potential Contaminant Source/Land Use Score and Source Construction Score.

Final Susceptibility Scoring:

0 - 6 Low Susceptibility

7 - 12 Moderate Susceptibility

> 13 High Susceptibility

Surface Water Susceptibility Report

Public Water System Name: City of Elk River

Source: Elk River

Public Water System Number 2180013

01/31/05

1. System Construction		SCORE			
Intake structure properly constructed	YES	0			
Infiltration gallery or well under the direct influence of Surface Water	NO	2			
Total System Construction Score		2			
2. Potential Contaminant Source / Land Use		IOC Score	VOC Score	SOC Score	Microbial Score
Predominant land use type (land use or cover)	Forest, woodland	0	0	0	0
Farm chemical use high	NO	0	0	0	0
Significant contaminant sources *	YES	Numerous potential contaminant sources - See Table 1			
Sources of class II or III contaminants present within the 500' of intake		0	0	0	0
Agricultural lands within 500 feet	NO Less than 25% Agriculture Land	0	0	0	0
Three or more contaminant sources*	YES	1	2	2	1
Sources of turbidity in the watershed	YES	1	1	1	1
Total Potential Contaminant Source / Land Use Score		2	3	3	2
3. Final Susceptibility Source Score		4	5	5	4
4. Final Source Ranking		Low	Low	Low	Low

* Special consideration due to amount of contaminant sources and vulnerability of intake
Source is considered High Susceptibility